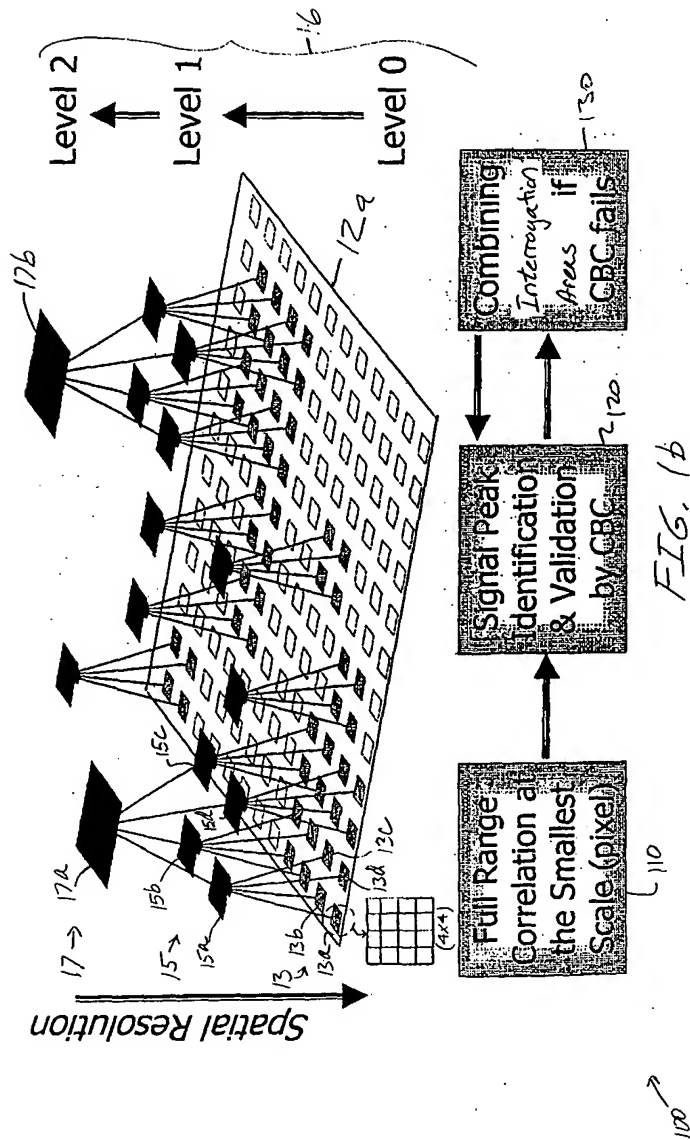


FIG. 1a



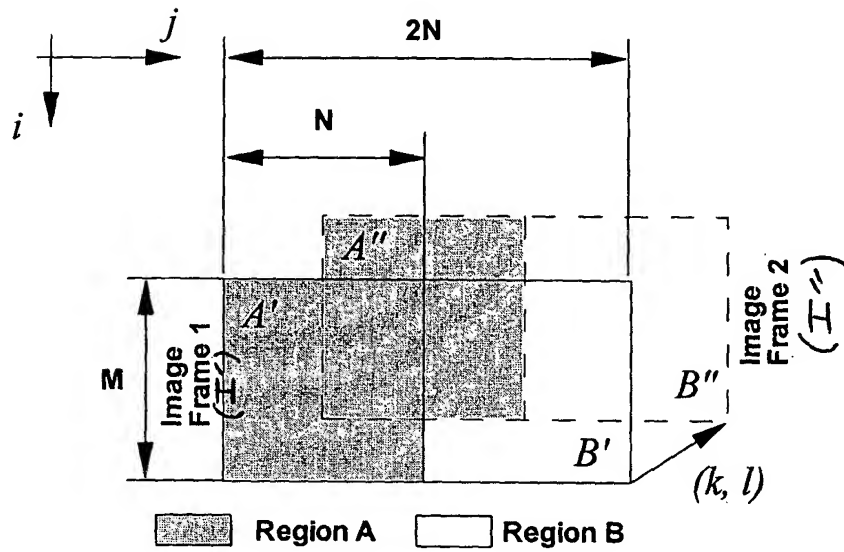


FIG. 2

A METHOD OF MULTI-RESOLUTION ADAPTIVE CORRELATION PROCESSING

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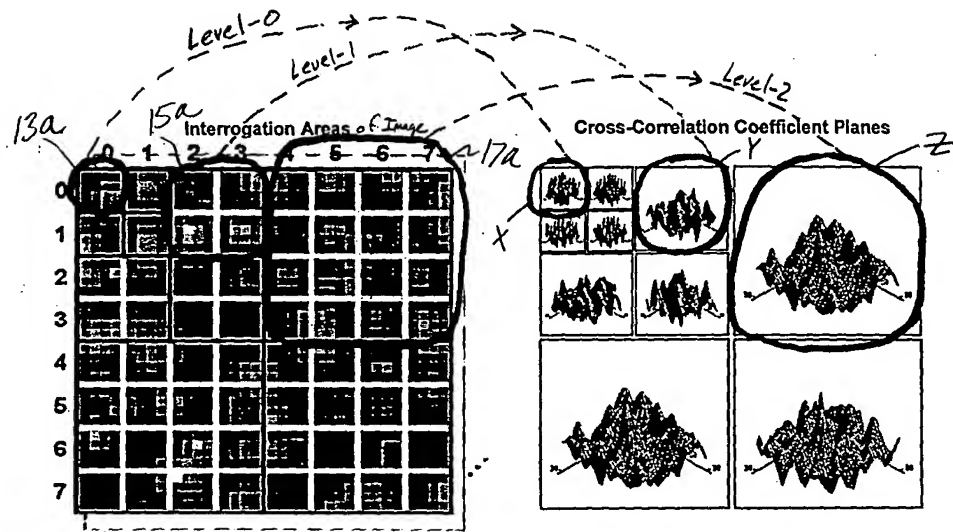


FIG. 3a

FIG. 3b

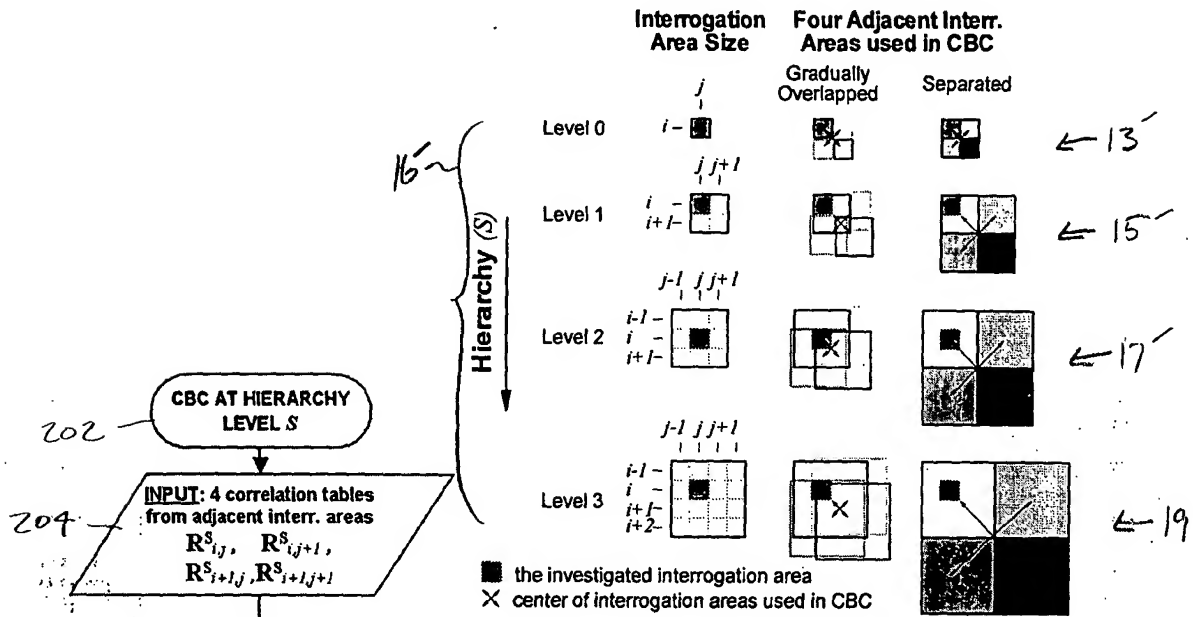


FIG. 4b

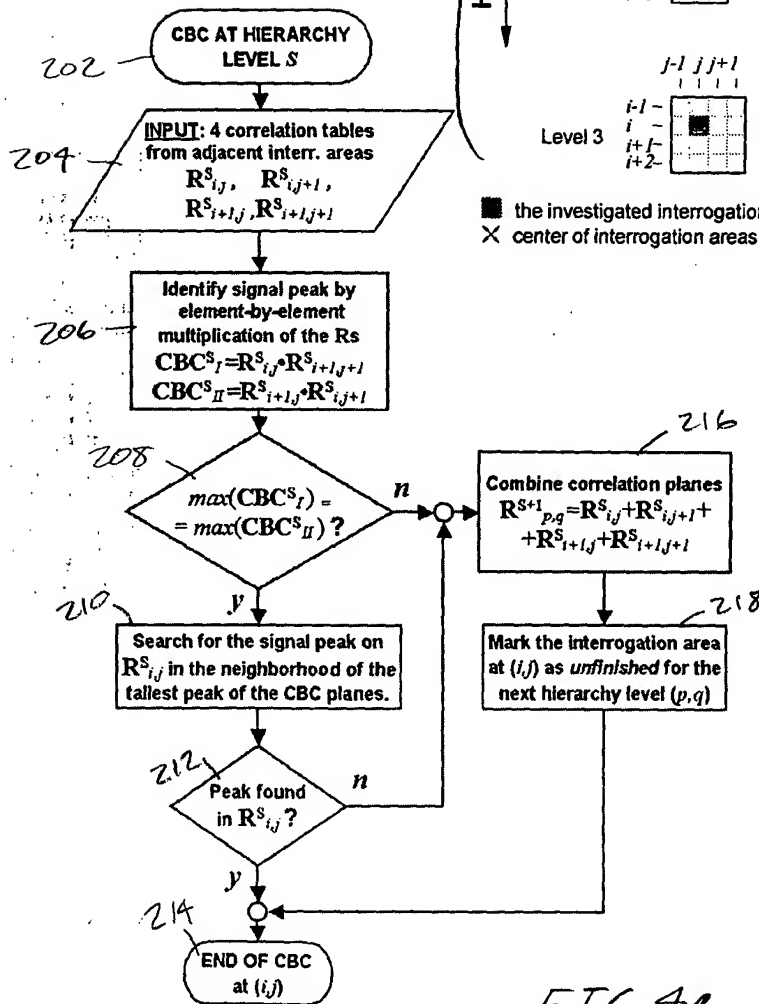


FIG. 4a

Full image size.....:  $(M+2\delta) \times (M+2\delta)$  pixels  
 Smallest interr. area size...:  $N \times N$  pixels  
 Search length.....:  $\delta \times \delta$  pixels  
 No. of spatial hierarchy  
 levels.....:  $S$

Combining interr.  
 areas ( $S=4$ )

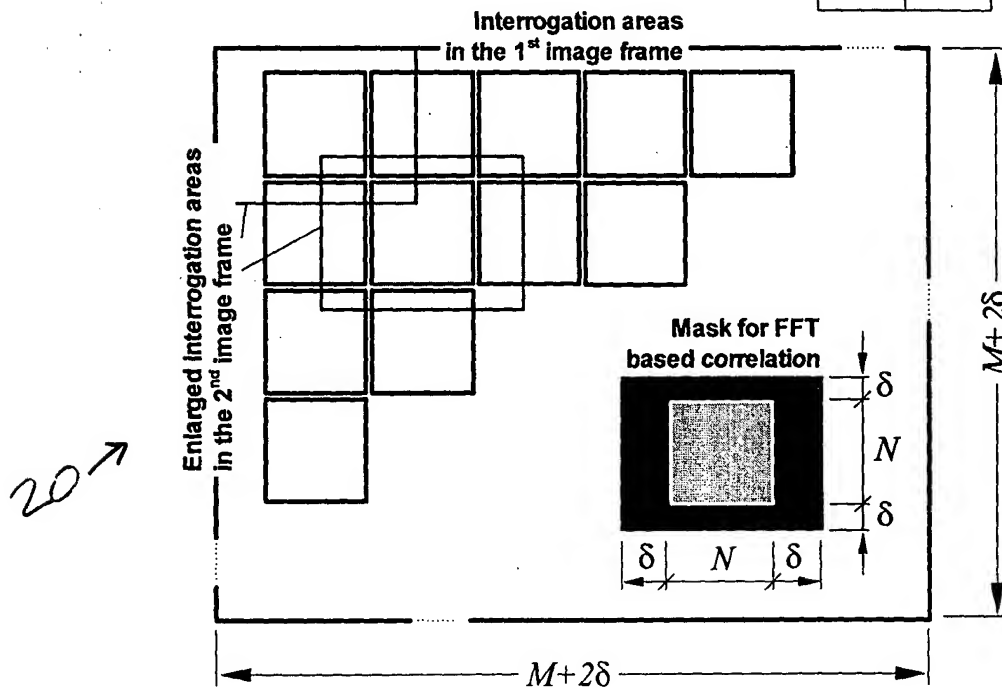
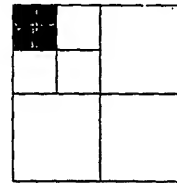


FIG. 5

FIG. 6a

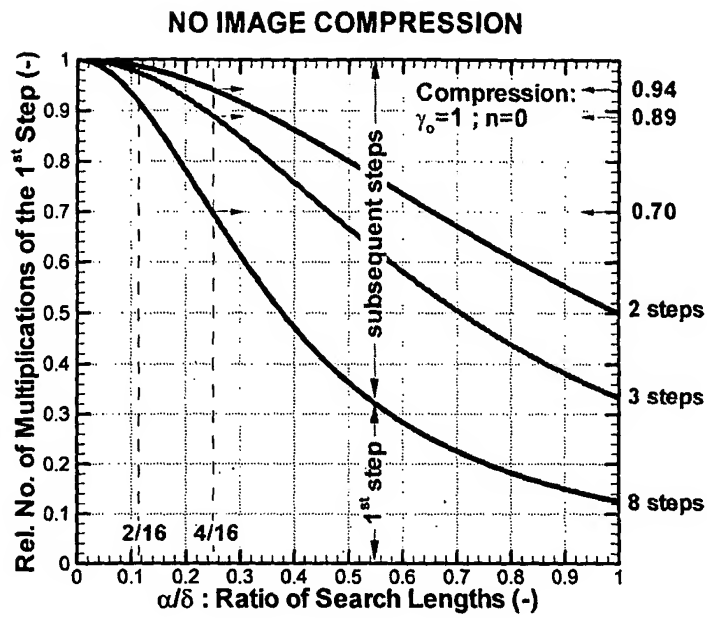
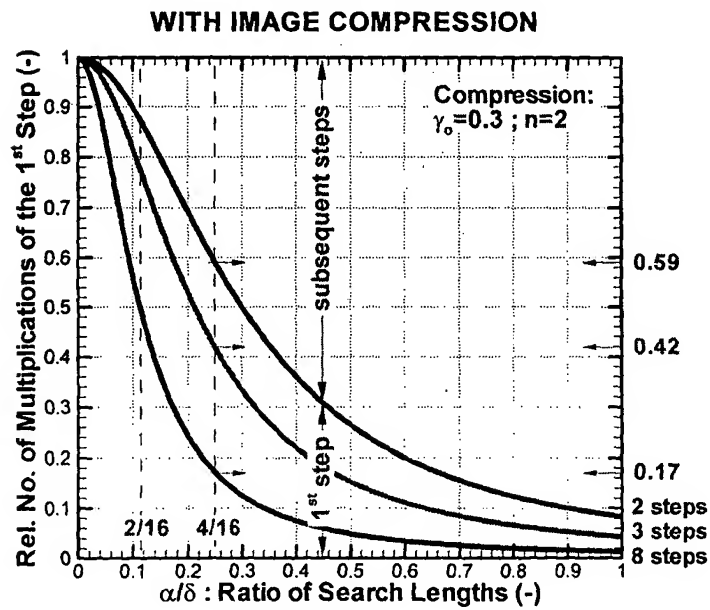


FIG. 6b



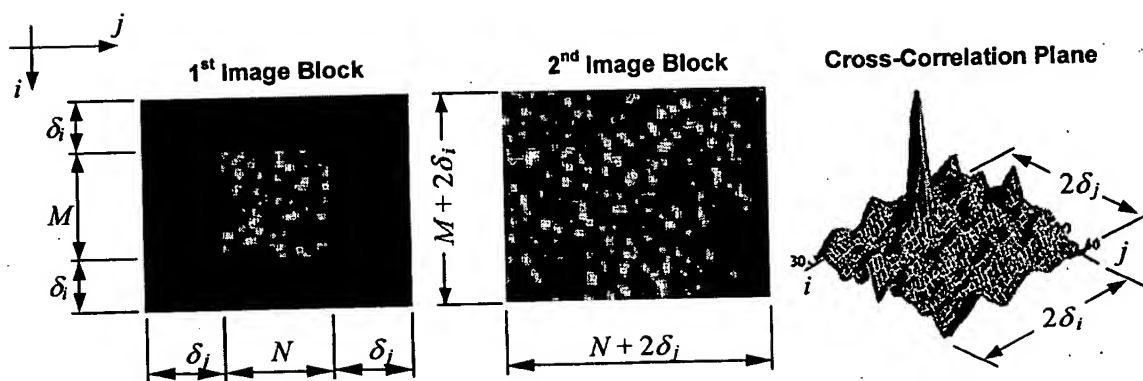


FIG. 7a

FIG. 7b

FIG. 7c



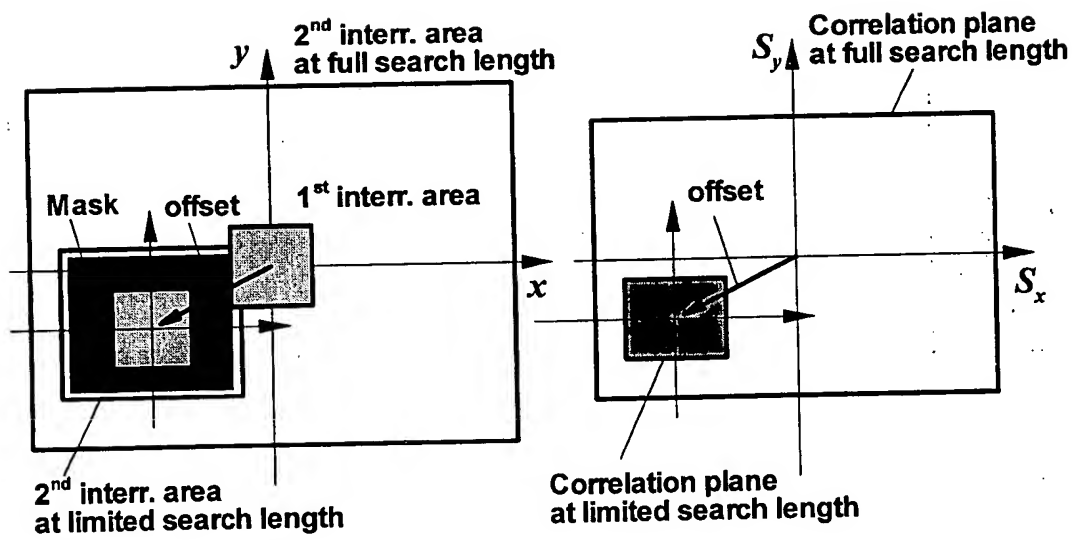


FIG. 8

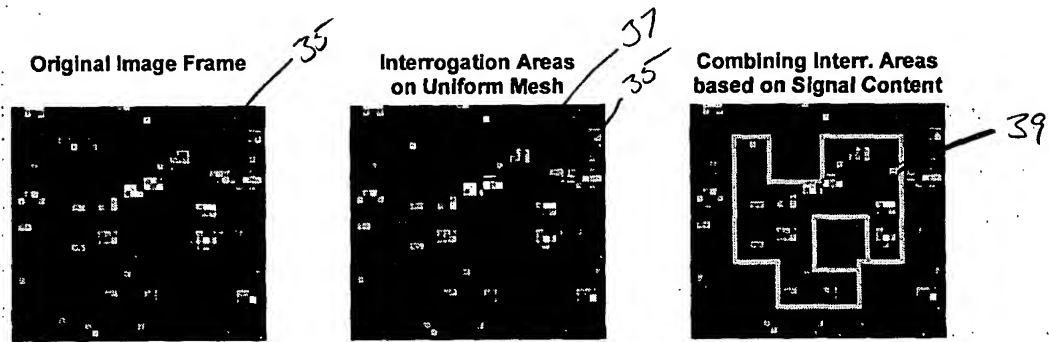


FIG. 9a

FIG. 9b

FIG. 9c

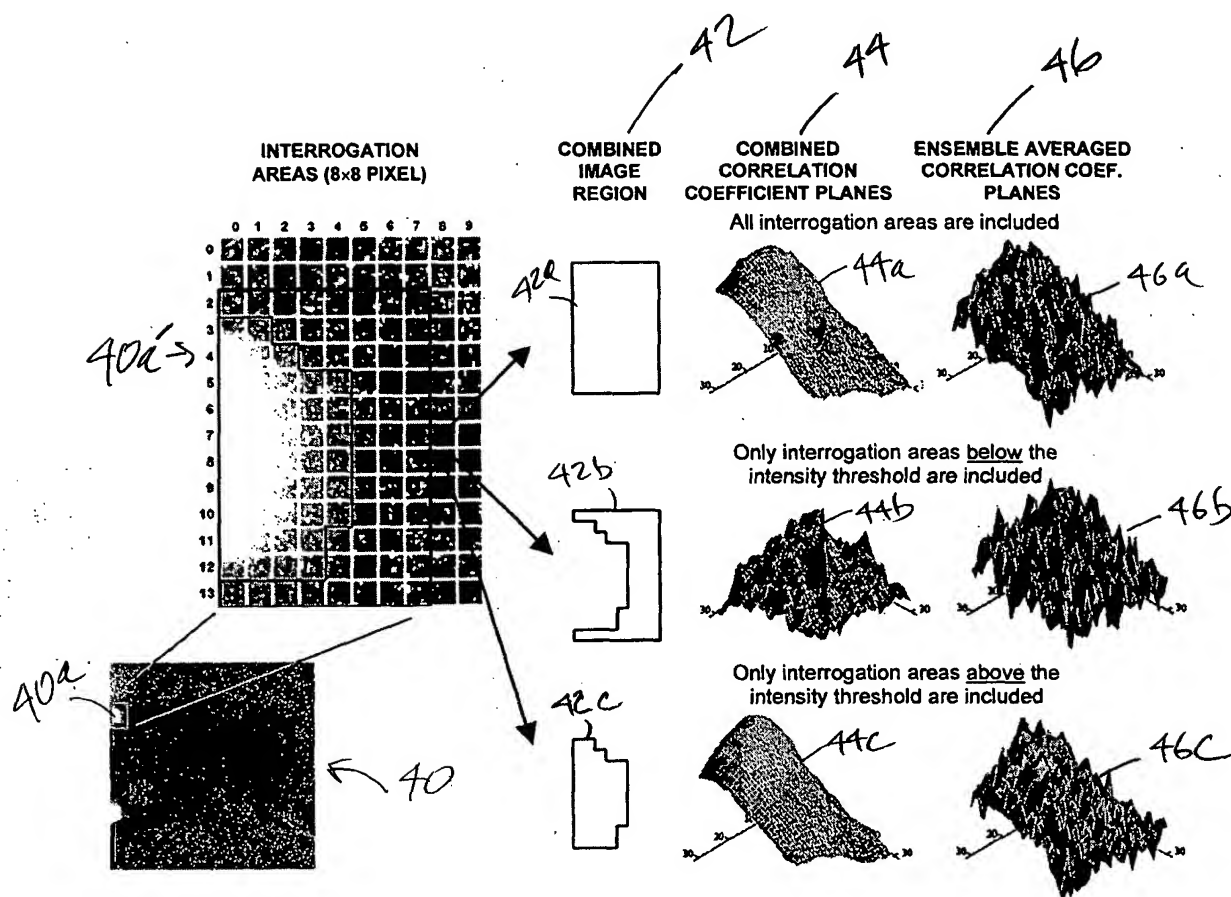


FIG. 10

# A METHOD OF MULTI-RESOLUTION ADAPTIVE CORRELATION PROCESSING

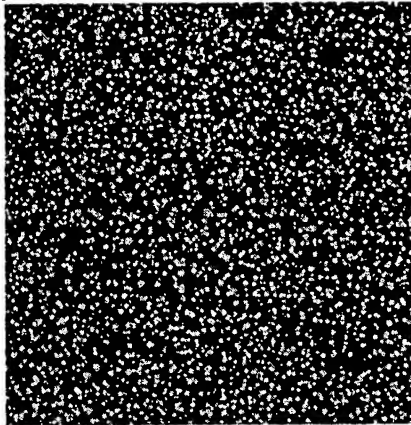
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## VSJ PIV STANDARD IMAGE #23: 3D JET IMPINGEMENT/DENSE PARTICLE

FIG. 11a

First Image Frame



Overlaid 1<sup>st</sup> and 2<sup>nd</sup> Image Frames

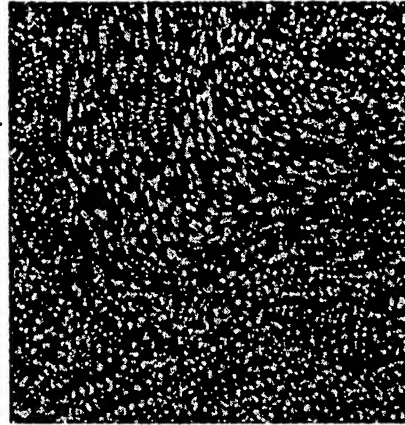
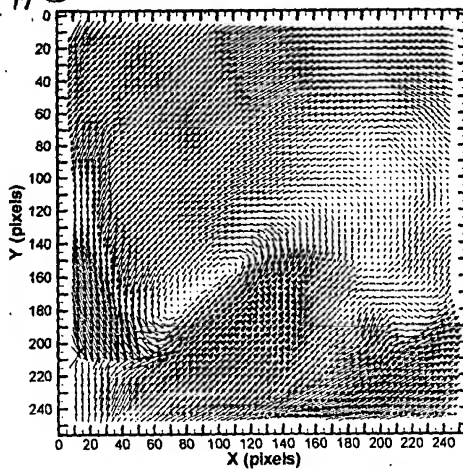


FIG. 11b

FIG. 11c

Vector Field on a Regular Mesh



Distribution of Interrogation Area Size

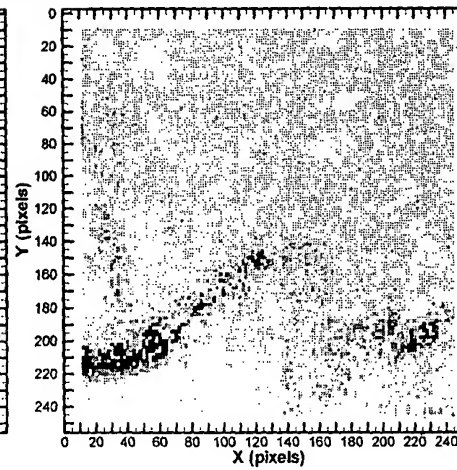


FIG. 11d

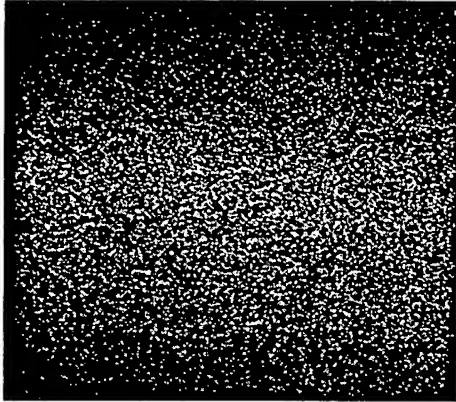
| Levels of Hierarchy<br>(Interrogation area size in pixels<br>& percent of vectors) |         |         |
|--|---------|---------|
| 10   | (22x22) | 0.10 %  |
| 9  | (20x20) | 0.28 %  |
| 8  | (18x18) | 0.68 %  |
| 7  | (16x16) | 0.22 %  |
| 6  | (14x14) | 0.11 %  |
| 5  | (12x12) | 0.35 %  |
| 4  | (10x10) | 0.22 %  |
| 3  | (8x8)   | 1.00 %  |
| 2  | (6x6)   | 4.42 %  |
| 1  | (4x4)   | 84.62 % |
| 0  | (2x2)   | 27.82 % |

Image & Processing  
Parameters:  
• VSJ Standard Image #23  
• 256x256 pixel  
Full image size  
• 2x2 pixels initial  
Interrogation area size  
• search length  
R: -2...+10 pixel  
V: -8...+8 pixel  
• 0% overlap  
• max. 10 hierarchy  
levels in resolution  
• median validation on  
3x3 kernel (11<sup>th</sup> level)  
• smoothing of final  
vector field on 3x3  
kernel

HIGH REYNOLDS NUMBER SWIRLING FLOW UNDERGOING SUDDEN EXPANSION

FIG. 12a

First Image Frame



Overlaid 1<sup>st</sup> and 2<sup>nd</sup> Image Frames

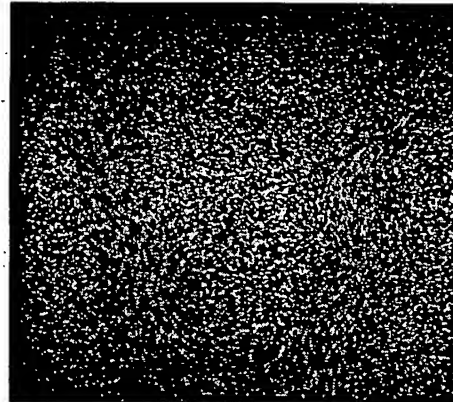
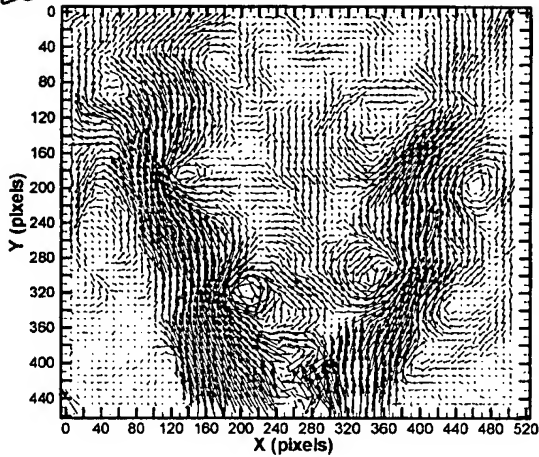


FIG. 12b

FIG. 12c

Vector Field on a Regular Mesh



Distribution of Interrogation Area Size

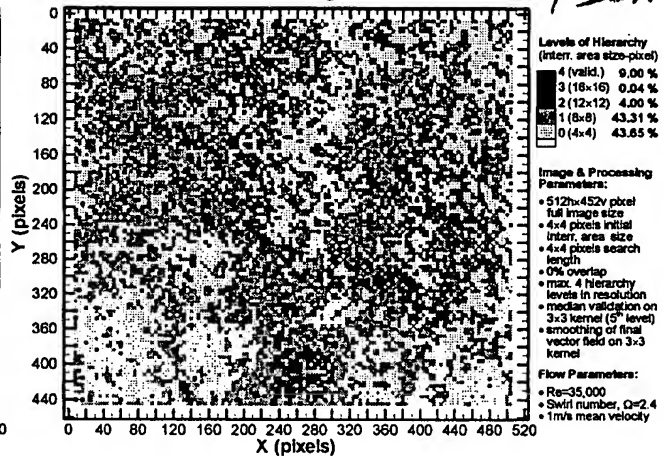


FIG. 12d